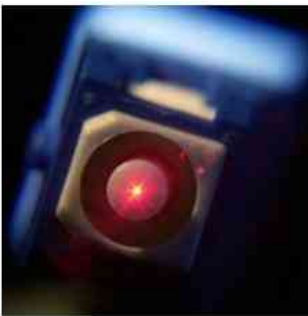




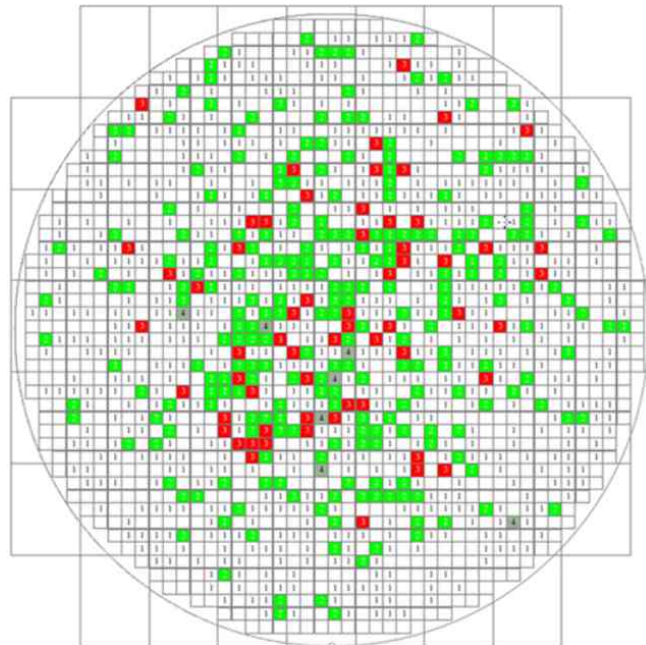
Vertically Integrated Systems

Product Catalog



Fiber Optics Components
and Services

2016



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www.v-i-systems.com

VI Systems GmbH Hardenbergstrasse 7 D-10623 Berlin



Table of Content

Introduction.....	4
Fabless Company Concept.....	5
Services for optical component technology	
Integrated Optical Solutions.....	6
Wafer mapping services.....	7
High frequency test and characterization.....	8
Optical and mechanical measurements	9
Modelling and simulation	10
Fiber coupled 850nm VCSEL transmitters	
up to 100 Gbit/s single channel module.....	11
up to 300 Gbit/s parallel optical testboard.....	13
Fiber coupled photodetectors and receivers for 700- 890nm	
up to 50 Gbit/s single channel module.....	15
up to 300 Gbit/s parallel optical testboard.....	16
Fiber coupled photodetectors and receivers for 900-1350 nm	
28 Gbit/s single channel modules.....	17
Ceramic Testboards for up to 40 Gbit/s	
Transmitter test boards (VCSEL /driver).....	18
Receiver test boards (PIN PD / TIA).....	18



Table of Content

High Speed ICs for 28Gbit/s and 50 Gbit/s	
28 /50 Gbit/s VCSEL driver.....	19
50 Gbit/s modulator driver.....	19
50 Gbit/s Transimpedance Amplifier (TIA).....	20
850nm VCSELs and photodetectors for up to 50 Gbit/s	
850nm single VCSEL	21
850nm VCSEL arrays.....	21
700-890nm single PIN PD.....	22
700-890nm PIN PD arrays.....	22
Avalanche photo detectors	
Large size sensor 800 -1700 nm.....	23
High speed photodetector.....	23
Light emitting diodes	
580nm red LED.....	24
610nm amber LED.....	24



Vertically Integrated Systems

Company Introduction

VI Systems GmbH (VIS), is a fabless developer and manufacturer of ultrafast cost-effective optoelectronic devices for short reach optical communication interconnects and optical sensor applications. The company is located in center of Berlin - Charlottenburg, Germany in close proximity to leading research institutes and academic technical institutions.



Photo of the building at Hardenbergstr. 8 in Berlin. The company occupies two floors in the upper part of the building including a technical zone with electro-static-damage (ESD) protected work areas.

VI Systems GmbH offers optical subassemblies and fiber coupled modules for applications in optical data communications and optical sensing. In contrast to current optical- and electrical-based technologies, the optical solutions based on VIS components and systems will overcome the rising technological barriers created by the market driven continual increase in optical data transmission rates. With VIS proprietary solutions, telecom and computer equipment manufacturers will be able to meet the continuously growing performance requirements of the future.

Based on the Company's advanced proprietary technology, innovative design concepts, and technical expertise, VIS devices offer a unique combination of high speed, low power consumption, reliability, and low cost. VI Systems' uniqueness is based on its revolutionary concept of vertically-integrated modulator systems a new concept in ultrahigh-speed optical signal transmission and the integration into a low cost fiber optics components.

The company offers a range of optical components, integrated circuits and highly optimized packaging solutions as well as engineering services.

Foundry based operation model

VI Systems designs and manufacturer optical components with the leading foundries in the world. Therefore the reliability of the process and the scalability is ensured from the very early stage of the development. Crucial steps in design and product verification are performed in-house. VI Systems operates a wafer inspection facility and a high speed test and device characterization laboratory in Berlin, Germany.

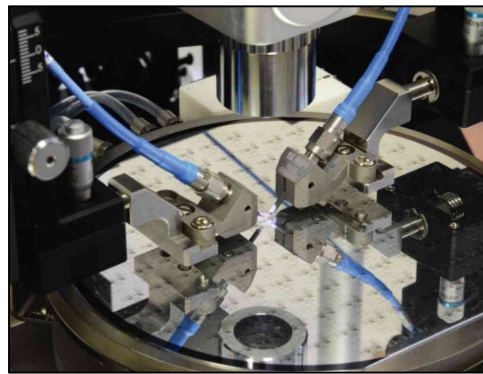


Photo: Wafer inspection systems at VI Systems

VI Systems concentrates on the design and qualification of ultrahigh-speed components for data transmission and high accuracy optical sensors. The manufacturing of optical components, integrated circuits and optical packaging is outsourced to foundries and electronics manufacturing service companies.

Our optical components and integrated products are sold to major manufacturing companies, who then use these components to produce high speed optical modules which are the basis of virtually all optical data transmitting systems.

VI Systems leads a trend in the fiber optic communications industry where manufacturers increasingly seek to outsource production to specialized foundries in order to reduce overall costs and accelerate time to market.

Integrated Optical Solutions

A novel concept of integrated ultrahigh-speed components is introduced by VI Systems. State-of-the-art SiGe BICMOS integrated circuits are customized to match the performance of ultrahigh-speed optical VCSEL transmitter and PIN receiver components. Both key elements are assembled in a proprietary high frequency design to delivery outstanding performance over a wide temperature range .

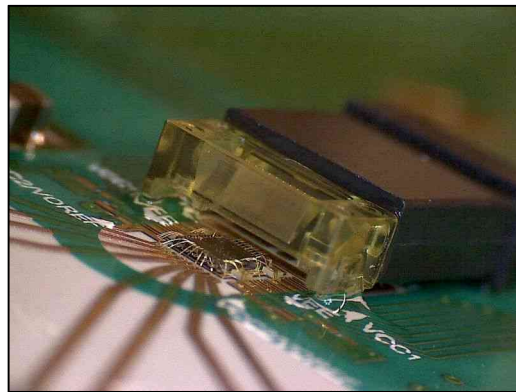


Photo: parallel opto-electronic microassembly

VI Systems offers a range of subcomponents for the use in short reach optical interconnects. The optical engines offer a unique combination of high speed, low power consumption, small footprint, high reliability and low cost.

VI Systems' unique selling point is based on a combination of its revolutionary concept of ultra-high frequency small footprint micro-assembly integration of advanced electro-optic components, development of advanced high speed ICs and development of modulation approaches.

Services for optical component technology

Wafer mapping services

VI Systems new semi-automatic wafer prober station performs high-speed electrical and optical testing of wafers early in the manufacturing process. The system reduces manufacturing costs by eliminating out of specification wafers before they have been cut and packaged to improve yield.

We offer 100% wafer characterization of 2" to 8" wafer using an alignment camera with pattern recognition with automatic alignment to the chips. The test temperature to ranges from 25°C to 150°C. Measurement of L/I/V parameters, threshold current, slope efficiency, measurements of optical spectrum, photodiode sensitivity, reverse bias and dark current.

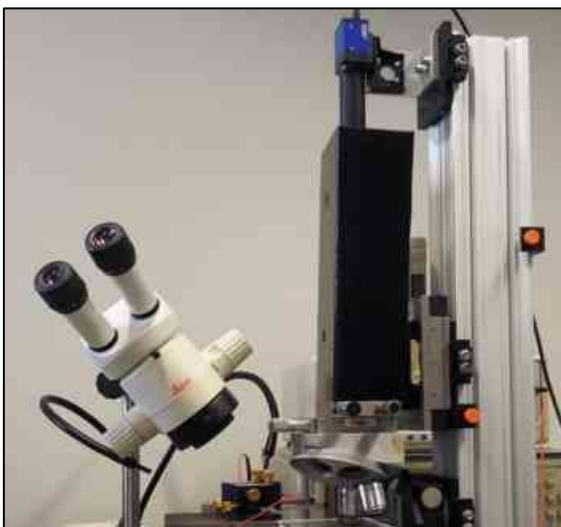


Photo: camera system for farfield studies

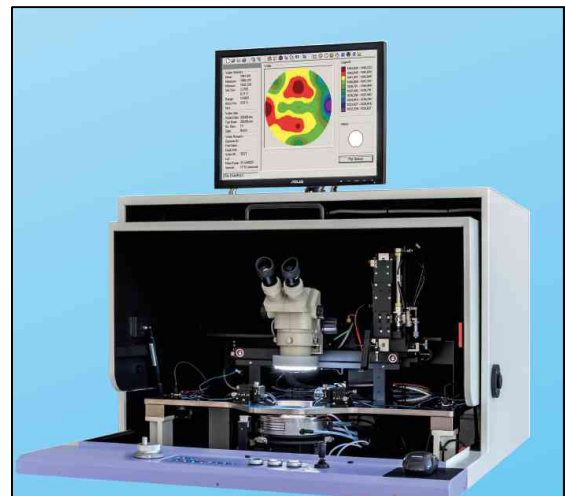


Photo: automatic wafer prober equipment

Testing of optical emission characteristics

Our test station setup allows nearfield and farfield analysis of light emitting devices at temperatures of up to 150°C with a special interference-free infrared optics and camera

Nearfield measurements are performed to determine emitting diameter and mode emission characteristics as well as the measurement of mode field diameter and polarization characteristics.

Farfield measurements provide information on the angular distribution of power and the overall emission characteristics as well as the maximum emission angle.

Services for optical component technology

High frequency test services

Our high frequency test laboratory allows a detailed analysis of the electro-optical performance of chip level devices. For general bandwidth measurement a sine wave frequency generator for up to 38 GHz can be combined with a 70 GHz sampling oscilloscope. For optical test a 32 GHz detector for 700nm to 1600nm is available.

Specific optical data modulation characteristics and eye-diagram measurements of up to 64 Gbit/s can be performed. Our bit pattern generator generates a range of standard pseudo random bit sequences such as PRBS7 and PRBS31. For high speed test of short reach application at 850nm wavelength a range photodetector and photoreceiver modules with for up to 50 Gbit/s are available.

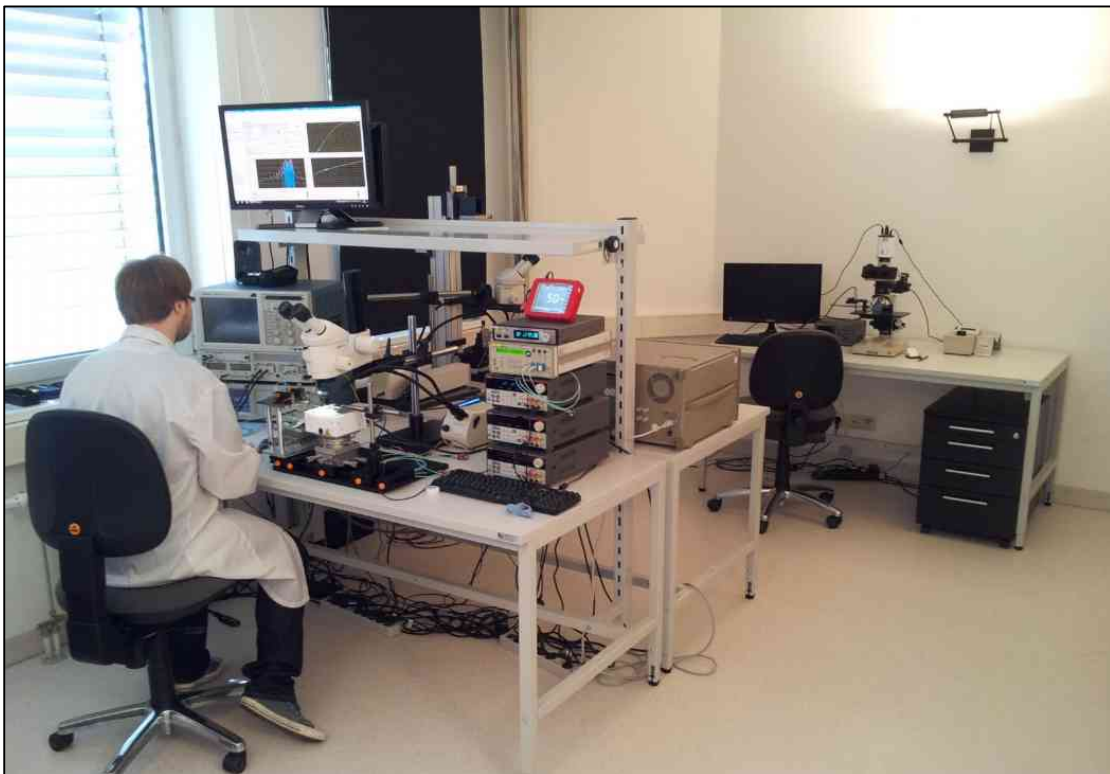


Photo: high frequency test laboratory for data transmission experiments

Services for optical component technology

Optical and Mechanical Inspection

We offer a range of inspection tools to determine the the properties of optical components. Our laboratory is equipped with conventional optical microscopes with a magnification of up to 1000 times.

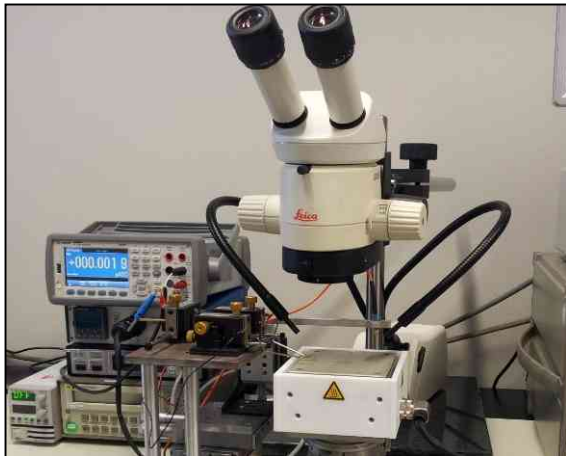


Photo: stereo microscope with temperature chuck

More complex studies using focused ion beam (FIB), scanning electron microscopy (SEM) and transmission electron microscopy (TEM) are performed with external test partners

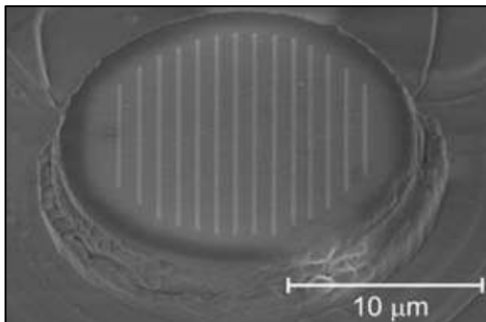


Image: structure analysis with TEM



Photo: high resolution optical microscope

With our thickness analysis technology we can determine horizontal dimensions with resolution of 0.1 μm and vertical dimensions with a resolution of 0.5 μm .

Testing of VCSEL, LED, PD, APD

Our microprober station allows on-wafer characterization test in a wide temperature rang. For static test we can measure electrical charateristics such as forward and reverse voltage or current and differential resistance. Optical test characteristics include paramters such As power, spectrum, sensitivity, efficiency, threshold current, slope efficiency and amplification

Services for optical component technology

Thermal analysis

Simulation tools for the thermal modeling of semiconductor packages have now become routine in most design processes. From early spreadsheet-type tools that were in vogue a couple of decades ago, many designers now use sophisticated FEA (Finite Element Analysis) or CFD (Computational Fluid Dynamics) tools, and interface their mechanical CAD data directly into their analysis.

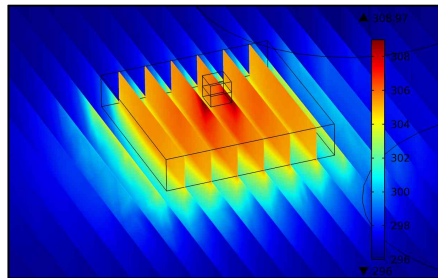


Image: thermal analysis of connector

Modelling and simulation

VCSELs are key components for optical interconnects and are widely applied in high-performance computers and data centers. Single transverse-mode VCSELs are used in sensing, illumination, and display applications. The image below shows a cross section of the simulated electric field of the fundamental and first excited optical modes of an oxide-confined aluminum gallium arsenide-based leaky VCSEL.

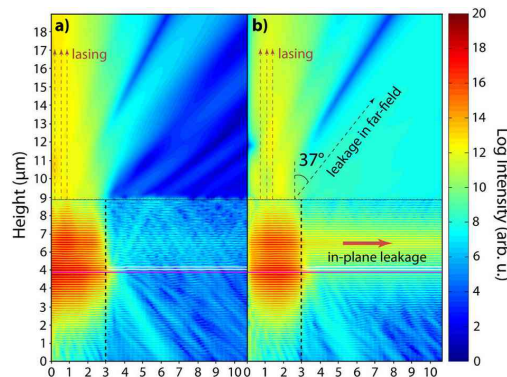


Image: Radial distribution of the simulated electric field of oxide-confined leaky vertical-cavity surface-emitting laser (VCSEL) optical modes. (a) Fundamental optical mode. (b) First excited mode.

850nm VCSEL transmitter modules

V25-850M Multi Mode Fiber Coupled VCSEL Transmitter Module (up to 28 Gbit/s)



Parameter	Typical
Emission Wavelength	850 nm
Data rate	28 Gbit/s
Fiber Type	50/125 μm

CM-850M01 Single Mode Fiber Coupled VCSEL Transmitter Module (up to 30 Gbit/s)



Parameter	Typical
Emission Wavelength	850 nm
Data rate	30 Gbit/s
Fiber Type	5/125 μm

V50-850M Multi Mode Fiber Coupled VCSEL Transmitter Module (up to 50 Gbit/s)



Parameter	Typical
Emission Wavelength	850 nm
Data rate (NRZ)	50 Gbit/s
Fiber Type	50/125 μm

VM50-850M Multi Mode Fiber Coupled VCSEL Transmitter Module (up to 50 Gbit/s)



Parameter	Typical
Emission Wavelength	850 nm
Data rate (4-PAM)	50 Gbit/s
Fiber Type	50/125 μm

850nm VCSEL transmitter modules

VM100-850M Multi Mode Fiber Coupled VCSEL Transmitter Module (up to 100 Gbit/s)



Parameter	Typical
Emission Wavelength	850 nm
Data rate (4-PMA/DMT/CAP)	100 Gbit/s
Fiber Type	50/125 μm

T25-850 Ultrahigh-Speed TOSA Transmitter subassembly (up to 28 Gbit/s)



Parameter	Typical
Emitting Wavelength	850 nm
Data rate	28 Gbit/s
Fiber Type	50/125 μm

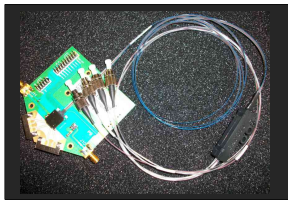
T40-850 Ultrahigh-Speed TOSA Transmitter subassembly (up to 40 Gbit/s)



Parameter	Typical
Emitting Wavelength	850 nm
Data rate	40 Gbit/s
Fiber Type	50/125 μm

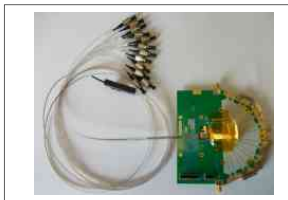
850nm VCSEL transmitter testboards

VHXT6204A-840 (4 x 25 Gbit/s)
Transmitter for up to 100 Gbit/s



Parameter	Typical
Emitting Wavelength	850 nm
Data rate	100 Gbit/s
Fiber type	50/125 ribbon

VHXT62012A-840 (12 x 25 Gbit/s)
Transmitter for up to 300 Gbit/s



Parameter	Typical
Emitting Wavelength	850 nm
Data rate	300 Gbit/s
Fiber type	50/125 ribbon

1300nm VCSEL transmitter modules

V10-1300M Multi Mode Fiber Coupled VCSEL
Transmitter Module (up to 12.5Gbit/s)



Parameter	Typical
Emission Wavelength	1270 nm
Data rate	12.5 Gbit/s
Fiber Type	50/125 μm

Optical receiver modules for 700-890nm

**D30-850M Multi Mode Fiber Coupled PIN
Photodetector Module (up to 50 Gbit/s)**



Parameter	Typical
Input wavelength	700-870 nm
3dB Bandwidth	> 30 GHz
Fiber Type	50/125 μm

**D20-980M Multi Mode Fiber Coupled PIN
Photodetector Module (up to 28 Gbit/s)**



Parameter	Typical
Input wavelength	900-1350 nm
3dB Bandwidth	> 20 GHz
Fiber Type	50/125 μm

**R25-850 Ultrahigh-Speed ROSA
Receiver subassembly (up to 28 Gbit/s)**



Parameter	Typical
Input wavelength	700-870 nm
Data rate	28 Gbit/s
Fiber Type	50/125 μm

**R40-850 Ultrahigh-Speed ROSA
Receiver subassembly (up to 40 Gbit/s)**

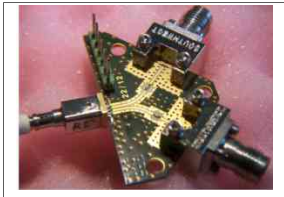


Parameter	Typical
Input wavelength	700-870 nm
Data rate	40 Gbit/s
Fiber Type	50/125 μm

Optical receiver modules for 800-890nm

R50-850

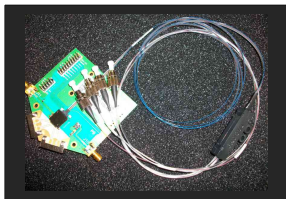
Receiver subassembly for up to 50 Gbit/s



Parameter	Typical
Input wavelength	700-870 nm
Data rate	50 Gbit/s
Fiber Type	50/125 μ m

VHXR6204A-840 (4 x 25 Gbit/s)

Receiver for up to 100 Gbit/s



Parameter	Typical
Input wavelength	700-870 nm
Data rate	100 Gbit/s
Fiber type	50/125 ribbon

VHXR6204A-840 (12 x 25 Gbit/s)

Receiver for up to 300 Gbit/s

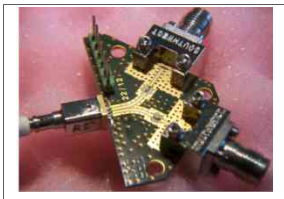


Parameter	Typical
Input wavelength	700-870 nm
Data rate	300 Gbit/s
Fiber type	50/125 ribbon

Optical receiver modules for 900-1550nm

R25-1300

Receiver subassembly for up to 28 Gbit/s



Parameter	Typical
Input wavelength	900-1350 nm
Data rate	28 Gbit/s
Fiber Type	50/125 μm

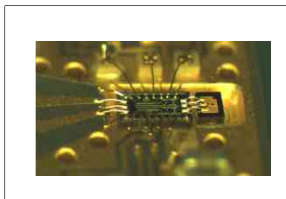
D30-900M Multi Mode Fiber Coupled PIN Photodetector Module for up to 28 Gbit/s



Parameter	Typical
Input wavelength	840-1550 nm
3dB Bandwidth	> 20 GHz
Fiber Type	50/125 μm

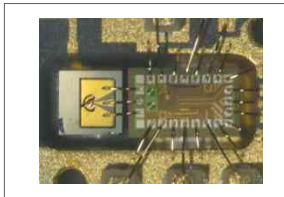
850nm VCSEL Testboards

**T40-850TB-WB 40Gbit/s transmitter
Testboard subassembly**



Parameter	Typical
Emitting Wavelength	850 nm
Rise/Fall Time	< 10 ps
Power dissipation	< 300 mW

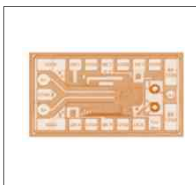
**R40-850TB-WB 40 Gbit/s receiver
Testboard subassembly**



Parameter	Typical
Operating Wavelength	700-890 nm
Bandwidth	> 35 GHz
Fiber Type	50/125 μm

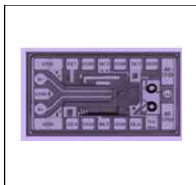
VCSEL Driver ICs

High Speed VCSEL driver IC (up to 28Gbit/s) A25-120C80



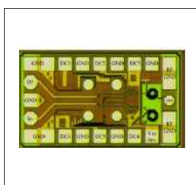
Parameter	Typical
Data rate	up to 28 Gbit/s
Supply voltage	3.3 V
Power dissipation	120mW

High Speed DM VCSEL driver chip (up to 50Gbit/s) A50-150C80



Parameter	Typical
Data rate	up to 50 Gbit/s
Supply voltage	3.3 V
Power dissipation	150 mW

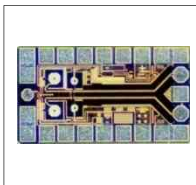
High Speed modulator driver chip (up to 50Gbit/s) A50-300C90



Parameter	Typical
Data rate	up to 50 Gbit/s
Supply voltage	5 V
Power dissipation	370mW

Transimpedance Amplifier (TIA)

High Speed TIA chip (up to 50 Gbit/s)
A50-150C80



Parameter	Typical
Differential electrical gain	3.0 k Ω
Bandwidth	35 GHz
Power dissipation	150 mW

850nm VCSELs - Vertical Cavity Surface Emitting Lasers

Ultrahigh-Speed VCSEL Chip (28 Gbit/s) V25-850C



Parameter	Typical
Emission Wavelength	850 nm
Peak Output Power	4 mW
Rise Time (20% to 80%)	< 15ps

High Speed VCSEL Chip (50 Gbit/s) V50-850C



Parameter	Typical
Emission Wavelength	850 nm
Peak Output Power	4 mW
No. of single chips	4 or 12

Ultrahigh-Speed VCSEL Array (28 Gbit/s) V25-850C4 / V25-850C12



Parameter	Typical
Emission Wavelength	850 nm
Peak Output Power	4 mW
No. of single chips	4 or 12

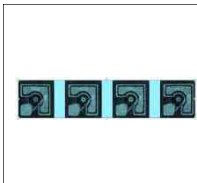
850nm Photodetector PIN Diode

High Speed Photodetector (up to 50 Gbit/s) D30-850C



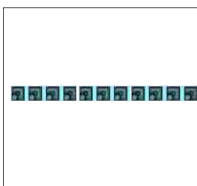
Parameter	Typical
Operating Wavelength	700-890 nm
3 dB Bandwidth	~ 30 GHz
Rise Time (20% to 80%)	6 ps

High Speed Photodetector (up to 50 Gbit/s) D30-850C4



Parameter	Typical
Operating Wavelength	850 nm
3 dB Bandwidth	> 30 GHz
No. of single PDs	4

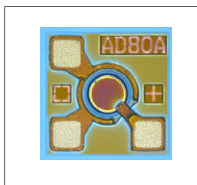
High Speed Photodetector (up to 50 Gbit/s) D30-850C12



Parameter	Typical
Operating Wavelength	850 nm
3 dB Bandwidth	> 30 GHz
No. of single PDs	12

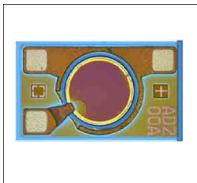
Avalanche Photodetectors

Large size photodetector
AP80-1700C



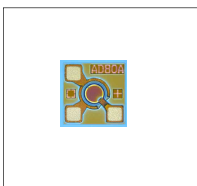
Parameter	Typical
Wavelength	950 - 1700 nm
Bandwidth	900 MHz
Chip active diameter	80 μm

Large size photodetector
AP200-1700C



Parameter	Typical
Wavelength	950 - 1700 nm
Bandwidth	500 MHz
Chip active diameter	200 μm

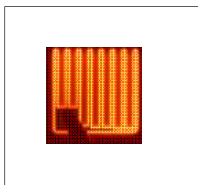
High speed photodetector
AP20-1700C



Parameter	Typical
Operating Wavelength	950 - 1700 nm
3 dB Bandwidth	> 20 GHz
Chip active diameter	20 μm

Light Emitting Diodes

Amber LED chip
L21-610nm



Parameter	Typical
Centroid wavelength	610 nm
Efficiency	>20 %
Emitter size	400x400 μm

Amber LED chip
L21-580nm



Parameter	Typical
Centroid wavelength	580 nm
Efficiency	>20 %
Emitter size	400x400 μm



Vertically Integrated Systems

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